

A New Species of *Drymaeus*  
(Gastropoda: Pulmonata: Bulimulidae)  
from Sonora and Sinaloa, Mexico

by

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*Abstract.* A new species, *Drymaeus reederi* Hoffman, is described from southern Sonora and Sinaloa, Mexico. A short discussion of other northwestern Mexico *Drymaeus* is included.

INTRODUCTION

DURING A TRIP to the Alamos area of Sonora, Mexico, over Christmas vacation in 1983, with Walter B. Miller, his wife Betty Sue, Edna Naranjo García, Jane E. Deisler, and Richard L. Reeder, I was surprised to find a population of *Drymaeus* living in trees along a remote canyon in southeastern Sonora. There has been no mention in the literature of *Drymaeus* occurring farther north than approximately Culiacan, Sinaloa. Subsequently, after she studied the land snail collection of the California Academy of Sciences, Jane Deisler informed me that it contained two lots of *Drymaeus* collected in Sonora by John T. Wright in 1931.

Taxonomic information about the Bulimulidae, and particularly *Drymaeus*, in Mexico is sparse, and in some cases inaccurate. The most recent attempts to bring order out of the chaos are by Breure and Eskens (BREURE, 1979; BREURE & ESKENS 1981). Breure and Eskens' work has helped greatly, but is only a start owing to the fact that many more collections must be made, and many more species compared.

SYSTEMATICS

Family BULIMULIDAE

Genus *Drymaeus* Albers, 1850

Subgenus *Mesembrinus* Albers, 1850

*Drymaeus reederi* Hoffman, sp. nov.

(Figures 1-3)

**Diagnosis:** A small *Drymaeus* with almost flat whorls and reproductive system characterized by the lack of an epiphallallic cecum.

**Description of shell of holotype:** Shell small, umbilicate, diameter about one-half height; all but embryonic and body whorls with three light brown spiral bands, broken into squarish spots on a white background over most of their lengths; body whorl displays lighter axial lines over a white background; embryonic whorls uniformly tan; entire shell glossy. Embryonic whorls, 1.8 in number, rounded with extremely fine, even spiral and radial threads, seeming to produce a very uniform field of square punctae. Post-embryonic whorls only slightly convex with irregularly spaced growth ribs and very shallow, closely spaced incised lines. Aperture subovate, its outer lip sharp, barely reflected, inner lip reflected around and almost effacing the rimate umbilicus. Maximum height 15.1 mm, diameter 7.3 mm; 5.6 whorls.

**Reproductive anatomy of holotype:** Diagnostic characters in penial complex. Penis 5.9 mm in length, partly covered by thick penial sheath 2.8 mm long; proximal 1.8 mm of penis contains highly convoluted glandular diverticuli. Epiphallus 3.5 mm long, its lumen lined by shallow longitudinal folds. Epiphallallic cecum lacking; short penial retractor muscle 0.2 mm long attached to apex of epiphallus. Vas deferens runs free from approximately its origin at base of prostate gland, along free oviduct and vagina, then turns distally and enters penial sheath 2.0 mm from genital orifice; it loops toward genital orifice, then continues proximally within the penial sheath, but externally to the penis, exiting the distal end of the sheath and running alongside the penis and epiphallus until its insertion at the end of the epiphallus.

**Variations in paratypes:** A total of seven adult entire shells and four immature or damaged shells was collected from the type locality. Of the undamaged adult shells, the

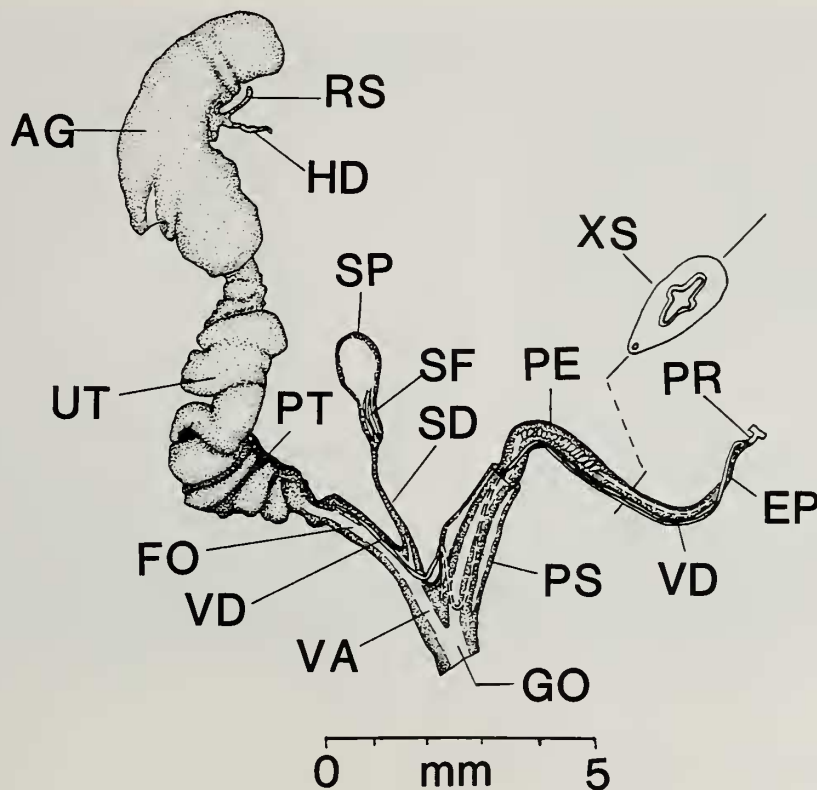


Figure 1

Genitalia of *Drymaeus reederii* sp. nov., holotype, J. E. Hoffman Collection no. 7. AG, albumen gland; EP, epiphallus; FO, free oviduct; GO, genital orifice; HD, hermaphroditic duct; PE, penis; PR, penial retractor muscle; PS, penial sheath; PT, prostate; RS, seminal receptacle; SD, spermathecal duct; SF, spermatophores; SP, spermatheca; UT, uterus; VA, vagina; VD, vas deferens; XS, cross section of epiphallus.

largest was 15.6 mm in height and 7.4 mm in diameter, and the smallest measured 13.0 mm in height and 6.4 mm in diameter; the mean height was 14.4 mm, and the mean diameter was 7.0 mm. The range of whorl counts was 5.6 to 6.0; the range of diameter-height ratios was 1.95 to 2.12. All specimens showed all of the characteristics of the holotype.

**Disposition of types:** Holotype: Santa Barbara Museum of Natural History no. 34664. Paratypes: Field Museum of Natural History no. 215221; R. L. Reeder Collection no. 698; W. B. Miller Collection no. 7344; J. E. Hoffman Collection no. 15.

**Type locality:** Sonora, Mexico; approximately 1 km east of Rancho Agua Salada, on the eastern slope of Arroyo el Taymuco in the Sierra San Ignacio. On the east slope of a canyon extending north from the road, on trees; 27°15.3'N, 108°46.5'W; elevation ca. 600 m.

**Remarks:** *Drymaeus reederii* is unusual, and probably unique, among *Drymaeus* in its lack of an epiphallic cecum. Other members of this genus found nearby are universally larger and, where the genitalia are figured, have

an epiphallic cecum. The species with which *D. reederii* would most likely be confused is *D. ziegleri* (Pfeiffer, 1846). However, *D. ziegleri* is larger (the shell of the holotype, according to the original species description, has a height of 29 mm and the specimen in the University of Arizona collection has a shell height of 23.0 mm, while the shell of the holotype of *D. reederii* is 15.1 mm high). Also, the whorls of *D. ziegleri* are more convex and the markings consist of radially arranged spiral bands that are not broken up into closely spaced spots as in *D. reederii*. The reproductive anatomy of *D. ziegleri* has never been described as such; however, I believe that it was described erroneously as *D. serperastrus* (Say, 1829) by BREURE & ESKENS (1981), whereas the correct reproductive anatomy of *D. serperastrus* is figured by SOLEM (1955). Whereas shells of *D. serperastrus* and *D. ziegleri* are similar, there are consistent differences (see PILSBRY 1899:39-40), and the former occurs only east of the central Mexican plateau while the latter occurs only west of it. Breure and Eskens did not illustrate their shell, but it was collected in Sinaloa, west of the Mexican plateau.

The size and shape of the shell of *Drymaeus reederii*, as well as the genitalia, are considerably different from



Figure 2

*Drymaeus reederii*, holotype, Santa Barbara Museum of Natural History no. 34664. Apertural and dorsal views. Scale = 1 mm.

those of any nearby *Drymaeus*, and its relationships to other snails in the genus are unclear.

The subgenus *Mesembrinus* Albers, 1850, was originally assigned to members of the genus *Drymaeus* that lacked an expanded or reflexed peristome (PILSBRY 1897-1898:194). BREURE (1979) and BREURE & ESKENS (1981) have modified this somewhat, adding such features as "mandibula with more than 20 plates, which are ca. 8 times as long as wide," and V- to W-shaped transverse rows of teeth on the radula. In addition, BREURE & ESKENS (1981:97) state that members of *Mesembrinus* have a mean number of 116.92 squares per 0.1 mm<sup>2</sup> of the protoconch sculpture whereas those of *Drymaeus* s.s. have 51.79. I found only 49 squares/0.1 mm<sup>2</sup> for *D. serperastus*, as opposed to the 57 found by BREURE & ESKENS (1981), but counted 56 squares/0.1 mm<sup>2</sup> for *D. zieglerei*, further indicating that *D. zieglerei* was probably the snail that they observed. I counted 90 squares/0.1 mm<sup>2</sup> on the embryonic whorls of *D. reederii*. In addition, *D. reederii* has a mandible, or jaw, with 38 plates, but these are only ca. 5 times as long as wide (Figure 3), and it has moderately V-shaped transverse rows of radular teeth, although these rows are almost straight; the radular formula is (78-92)-1-(78-92); a rachidian, and a typical latero-marginal tooth are illustrated in Figure 3.

For the reasons enumerated above, I have tentatively placed *Drymaeus reederii* in the subgenus *Mesembrinus*.

**Habitat and distribution:** Shells of *Drymaeus reederii* have been collected in one locality in the Sierra San Ignacio in addition to the type locality. The second locality was ca. 5 km west of the type locality. Both of these localities are within the Sinaloan deciduous forest biome (GENTRY, 1982). In addition, shells of *D. reederii* have been found in diverse parts of Sonora and Sinaloa within the Sinaloan thornscrub biome (BROWN, 1982). In 1931, John T. Wright collected an adult and a juvenile shell at ca. 700 m (*sic*) elevation near Alamos, Sonora, and four juvenile shells at ca. 1000 m (*sic*) near Chinobampo, Sonora, approximately 37 km WSW of Alamos. These elevations seem erroneous because the elevation given for the Alamos collection is equal to the elevation of the highest peak in the area, while that given for the Chinobampo collection is higher than any elevation shown on topographic maps of the area. In December 1983, Jane E. Deisler collected an adult shell in river drift 17 km south of Alamos; and in January 1973, Walter B. Miller collected two adult and two juvenile shells in Sinaloa, along Hwy 15, 89 km north of Mazatlán.

The exact range limits and the limiting factors for *Drymaeus reederii* have yet to be elucidated; however, we can assume that it is limited to the Sinaloan biogeographic province. Its eastern limit is fairly definite, bounded by the steep rise into the Sierra Madre and the Madrean evergreen woodland biome; the northern limit within the

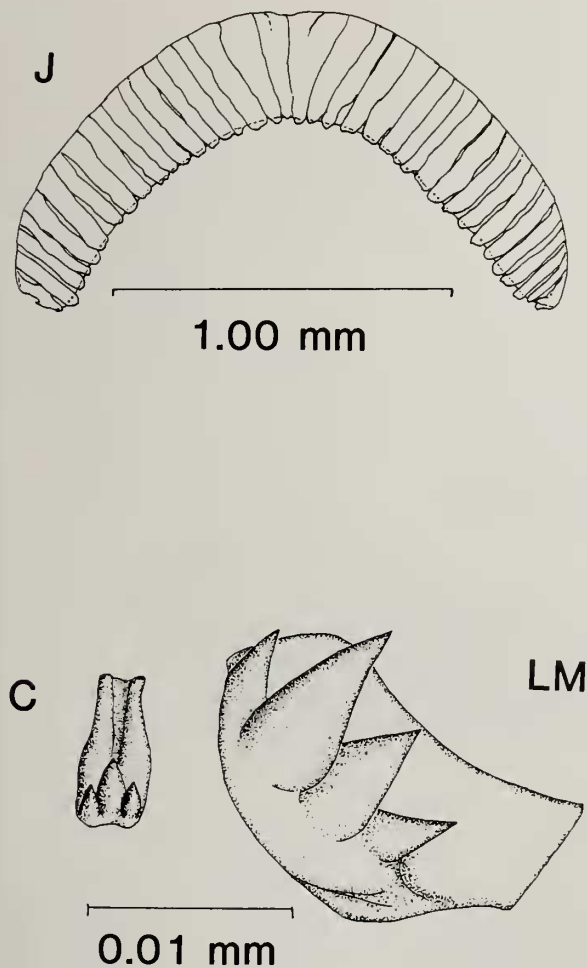


Figure 3

Jaw and radula of *Drymaeus reederi*, holotype, J. E. Hoffman Collection no. 7. J, jaw; C, rachidian tooth; LM, 13th latero-marginal tooth.

Sinaloan thornscrub biome will probably be found to be slightly north of Alamos because rainfall within this biome gradually decreases and becomes less regular toward the north; the western limit is probably caused by the reduction in elevation as the land approaches the Gulf of California; the southern limit can only be a source of conjecture. To the south, the rainfall increases, the forest becomes

thicker, and other arboreal species of *Drymaeus* begin to appear.

Dominant plants at the type locality include *Cassia emarginata*, *Pachycereus pecten-aboriginum*, *Stenocereus thurberi*, *Jatropha platanifolia*, and *Bursera* spp.

**Etymology:** This species is named for Richard L. Reeder, whose company I have enjoyed on this as well as several other expeditions into Mexico. It was his keen eyesight that enabled us to collect the holotype of this species.

#### ACKNOWLEDGMENTS

I would like to thank Edna Naranjo García, Jane E. Deisler, Walter B. Miller, and Richard L. Reeder for help in the procurement of specimens of *Drymaeus reederi* for this study. In addition, I thank Jane E. Deisler for suggesting that Breure and Eskens might be wrong in their descriptions of *D. serperastrus*, and for locating the specimens collected by John T. Wright in the California Academy of Sciences collection and apprising me of their existence and their collection numbers; in doing so, she has contributed greatly to the completeness of this manuscript. Additionally, I am very grateful to Carl C. Christensen for pointing out an error in my method of measuring the protoconch sculpture. I am also grateful to Robert Van Syoc and Tony Summers, both of the California Academy of Sciences, for the loan of material.

#### LITERATURE CITED

- BREURE, A. S. H. 1979. Systematics, phylogeny and zoogeography of Bulimulinae (Mollusca). Zool. Verh. Leiden 168: 1-215; pls. 1-3.
- BREURE, A. S. H. & A. A. C. ESKENS. 1981. Notes on and descriptions of Bulimulidae (Mollusca, Gastropoda), II. Zool. Verh. Leiden 186:1-111; pls. 1-8.
- BROWN, D. E. 1982. Sinaloan thornscrub. Pp. 101-105. In: D. E. Brown (ed.), Desert plants 4(1-4):1-342.
- GENTRY, H. S. 1982. Sinaloan deciduous forest. Pp. 73-78. In: D. E. Brown (ed.), Desert plants 4(1-4):1-342.
- PILSBRY, H. A. 1897-1898. Manual of conchology (2) 11, American Bulimulidae: *Bulimulus*, *Neoptraeus*, *Oxychona* and South American *Drymaeus*. (Philadelphia):1-339; pls. 1-51.
- PILSBRY, H. A. 1899. Manual of Conchology (2) 12, American Bulimulidae: North American and Antillean *Drymaeus*, *Leiostracus*, Orthalicinae and Amphibuliminae. (Philadelphia):1-258; pls. 1-64.
- SOLEM, A. 1955. Mexican mollusks collected for Dr. Bryant Walker in 1926: XI. *Drymaeus*. Occ. Papers Mus. Zool. Univ. Mich., 566:1-19; pls. 1-5.